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Lake Robinson, Chesterfield and Darlington Counties South Carolina

Corvallis Environmental Research Lab, Oreg

Prepared for

Environmental Monitoring and Support Lab, Las Vegas, Nev

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.F.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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REPORT

ON

LAKE ROBINSON

CHESTERFIELD AND DARLINGTON COUNTIES

SOUTH CAROLINA

EPA REGION IV

WORKING PAPER No. 437

WITH THE COOPERATION OF THE

SOUTH CAROLINA DEPARTMENT OF HEALTH AND

ENVIRONMENTAL CONTROL

AND THE

SOUTH CAROLINA NATIONAL GUARD

JUNE, 1975

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the South Carolina Department of Health and Environmental Control for professional involvement, to the South Carolina National Guard for conducting the tributary sampling phase of the Survey, and to those South Carolina wastewater treatment plant operators who voluntarily provided effluent samples and flow data.

The staff of the South Carolina Bureau of Wastewater and Stream Quality Control provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

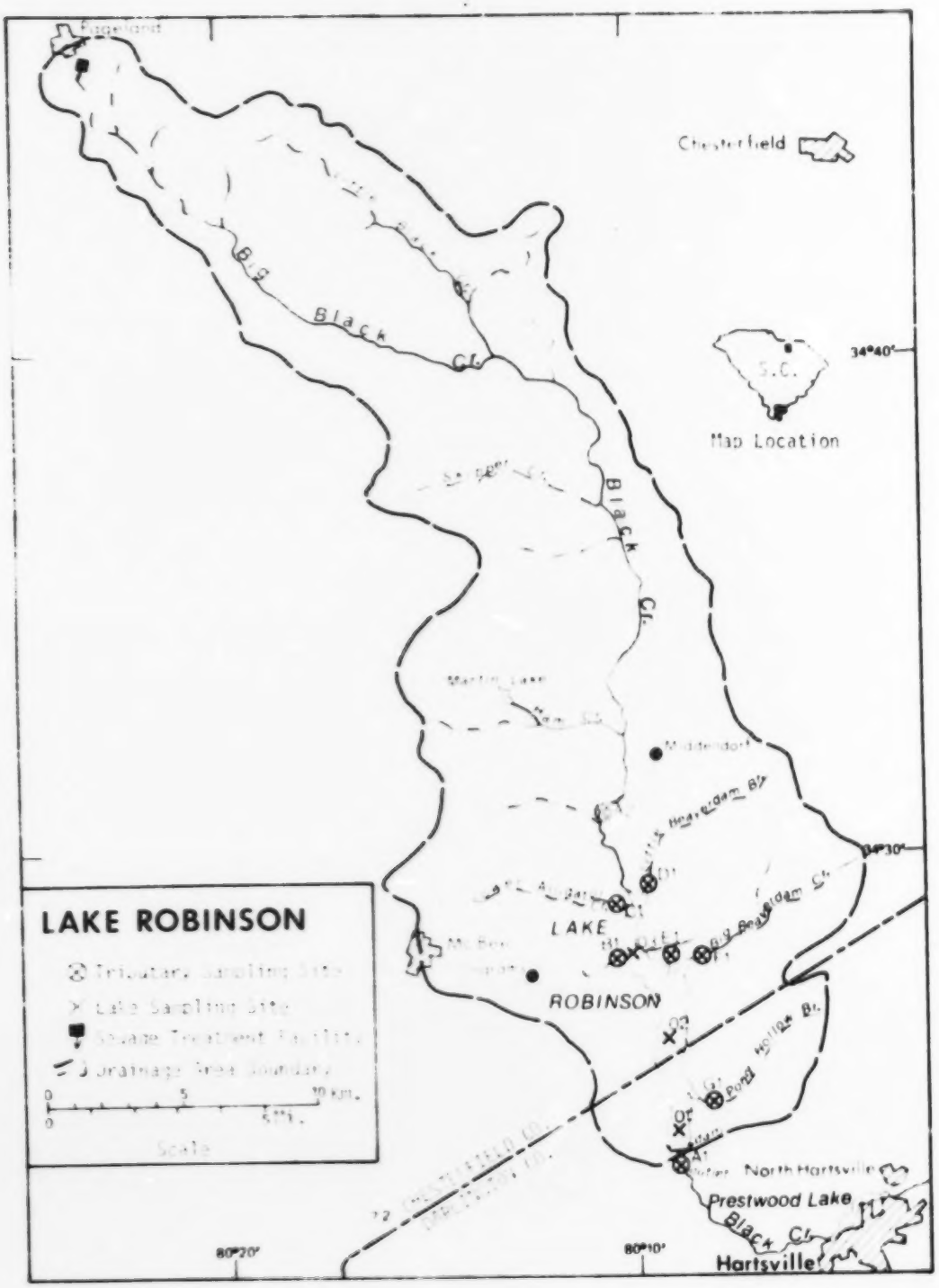
Major General Robert L. McCrady, the Adjutant General of South Carolina, and Project Officer Lt. Colonel John P. DuPre (Retired), who directed the volunteer efforts of the South Carolina National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF SOUTH CAROLINA

NAME	COUNTY
Clark Hill	Abbeville, McCormick, SC; Columbia, Elbert, Lincoln, McDuffie, Wilks, GA
Fishing Creek	Chester, Lancaster
Greenwood	Greenwood, Laurens, Newberry
Hartwell	Anderson, Oconee, Pickens, SC; Franklin, Hart, Stephens, GA
Keowee	Oconee, Pickens
Marion	Berkeley, Calhoun, Claredon, Orangeburg, Sumter
Moultrie	Berkeley
Murray	Lexington, Newberry, Richland, Saluda
Robinson	Chesterfield, Darlington
Saluda	Greenville, Pickens
Secession	Abbeville, Anderson
Wateree	Fairfield, Kershaw, Lancaster
William C. Bowen	Spartanburg
Wylie	York, SC; Gaston, Mecklenburg, NC


Chesterfield
S.C.
Map Location
34°40'
34°30'
80°20'
80°10'
Black Cr.
LAKE
ROBINSON
Prestwood Lake
North Hartsville
Hartsville
LAKE ROBINSON
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
0 5 10 km.
Scale

LAKE ROBINSON

STORET NO. 4508

I. CONCLUSIONS

A. Trophic Condition:

Although the overall Survey data indicate Lake Robinson is mesotrophic, the rather low mean Secchi disc transparencies (0.9 to 1.2 m), the September mean chlorophyll a concentration of 16.6 ug/l (range of 11.9 to 20.5 ug/l), the phytoplankton associations, and the numbers and variety of macrophytes present are more indicative of a eutrophic condition.

Lake Robinson ranked third in trophic quality when the 13 South Carolina lakes sampled in 1973 were compared using an index of six parameters*. Two of the lakes had less median total and median dissolved orthophosphorus, four had less and one had the same median inorganic nitrogen, nine had less mean chlorophyll a, and four had greater mean Secchi disc transparency. Marked depression of dissolved oxygen with depth occurred at station 1 in July.

Survey limnologists noted considerable floating vegetation in the littoral zones near stations 2 and 3 in July and areas of floating and emergent macrophytes and some algal scums in the shoreline shallows near station 3 in September.

Lake Robinson is used as a source of cooling water for two

* See Appendix A.

thermal electric-generating plants operated by the Carolina Power and Light Company, and at times a greater volume of water is utilized in the once-through cooling circuits of the plants than is contributed by the tributaries of the lake (Foley, 1976).

B. Rate-Limiting Nutrient:

The algal assay results are not representative of conditions in the lake at the time the sample was taken because of nutrient changes in the sample during shipment.

The lake data indicate phosphorus limitation in March and July but probably nitrogen limitation in September.

C. Nutrient Controllability:

1. Point sources--During the sampling year, the phosphorus contribution of the Pageland wastewater treatment facility amounted to 28% of the total phosphorus input to Lake Robinson.

The phosphorus loading of 0.38 g/m^2 measured during the sampling year is less than that proposed by Vollenweider (Vollenweider and Dillon, 1974) as an oligotrophic loading (see page 13). However, the existing trophic condition of the lake indicates that either the loading is greater than indicated because of unaccounted-for inputs, or phosphorus inputs have been reduced recently.

As far as is known, there has not been any significant reduction in the phosphorus load from Pageland (Foley, op. cit.), and further study is needed to evaluate other possible sources (e.g., the

possible use of phosphorus compounds to control corrosion and/or fouling in the cooling circuits of the power plants).

2. Non-point sources--The non-point phosphorus contributions of the gaged tributaries accounted for 54.6% of the total load to the lake during the sampling year, and the ungaged minor tributaries and immediate drainage added an estimated 12.1%.

Collectively, the phosphorus export rates of the Lake Robinson tributaries were the lowest measured in South Carolina during the Survey sampling year (see page 13). Most of the runoff in the drainage is from the Carolina sand hills, and this probably accounts for the low export rates.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 8.68 kilometers^2.
2. Mean depth: 4.3 meters.
3. Maximum depth: >9.4 meters.
4. Volume: 37.005 x 10^6 m^3.
5. Mean hydraulic retention time: 66 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Black Creek	279.7	4.800
Unnamed Creek B-1	8.6	0.090
Lower Alligator Creek	17.5	0.180
Little Beaverdam Creek	21.8	0.230
Unnamed Creek E-1	3.2	0.033
Big Beaverdam Creek	25.7	0.260
Pond Hollow Branch	13.6	0.140
Minor tributaries & immediate drainage -	68.9	0.800
Totals	439.0	6.533

2. Outlet -

Black Creek	448.1**	6.533**

C. Precipitation***:

1. Year of sampling: 131.9 centimeters.
2. Mean annual: 112.3 centimeters.

† Table of metric conversions--Appendix B.
†† At maximum pool; Martin and Hanson, 1966.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake; outflow adjusted to equal sum of inflows.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Lake Robinson was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from a number of depths at three stations on the lake (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the last visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 9.4 meters at station 1, 7.0 meters at station 2, and 3.0 meters at station 3.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE ROBINSON
STONEY COVE 4508

PARAMETER	1ST SAMPLING (3/22/73) 4 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (7/ 6/73) 4 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (9/21/73) 4 SITES RANGE	MEAN	MEDIAN
TEMP (C)	12.4 - 17.6	16.5	17.2	28.4 - 34.0	30.6	31.5	23.2 - 32.3	28.6	28.4
DISS OXY (MG/L)	5.4 - 8.6	6.5	6.5	1.0 - 6.6	4.4	5.4	3.8 - 7.4	6.2	6.3
CNDCTVY (MICROMHO)	50. - 50.	50.	50.	50. - 50.	50.	50.	4. - 14.	13.	14.
PH (STAND UNITS)	5.4 - 6.6	6.1	6.1	5.3 - 5.6	5.4	5.4	5.6 - 6.3	6.0	6.1
TOT ALK (MG/L)	10. - 10.	10.	10.	10. - 10.	10.	10.	10. - 10.	10.	10.
TOT P (MG/L)	0.009 - 0.020	0.011	0.010	0.013 - 0.026	0.017	0.016	0.010 - 0.020	0.014	0.013
DISTHO P (MG/L)	0.002 - 0.006	0.004	0.004	0.005 - 0.020	0.008	0.006	0.010 - 0.016	0.012	0.011
NO2+NO3 (MG/L)	0.540 - 0.750	0.660	0.670	0.080 - 0.140	0.112	0.116	0.060 - 0.080	0.065	0.060
AMMONIA (MG/L)	0.070 - 0.100	0.071	0.070	0.080 - 0.310	0.151	0.120	0.060 - 0.130	0.081	0.075
KJEL N (MG/L)	0.100 - 0.500	0.340	0.400	0.100 - 1.000	0.445	0.400	0.400 - 1.400	0.700	0.550
INORG N (MG/L)	0.650 - 0.850	0.747	0.740	0.180 - 0.450	0.261	0.240	0.120 - 0.210	0.147	0.135
TOTAL N (MG/L)	0.940 - 1.210	1.050	1.070	0.380 - 1.110	0.557	0.500	0.490 - 1.480	0.785	0.610
CHLOPHYL A (UG/L)	1.4 - 9.4	6.5	9.0	1.5 - 3.5	2.4	3.0	11.9 - 20.5	16.0	17.3
SECCHI (METERS)	1.2 - 1.2	1.2	1.2	0.9 - 0.9	0.9	0.9	0.9 - 1.1	1.0	1.0

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
03/22/73	1. Cosmarium sp.	5,116
	2. Gynodinium sp.	82
	3. Cryptomonas sp.	58
	4. Ankistrodesmus (?) sp.	47
	5. Tabellaria sp.	12
	Other genera	24
	Total	5,339
07/06/73	1. Asterionella sp.	5,572
	2. Staurastrum sp.	182
	3. Synedra sp.	136
	4. Mallomonas sp.	68
	5. Flagellates	68
	Other genera	293
	Total	6,319
09/21/73	1. Cosmarium sp.	9,951
	2. Sphaerozoma sp.	5,850
	3. Staurastrum sp.	2,988
	4. Closterium sp.	2,671
	5. Desmids	477
	Other genera	95
	Total	22,032

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
03/22/73	1	9.4
	2	9.0
	3	1.4
07/06/73	1	3.0
	2	3.5
	3	1.5
09/21/73	1	17.3
	2	20.5
	3	11.9

C. Limiting Nutrient Study:

The algal assay results are not considered representative of conditions in the lake because of nutrient losses in the assay sample during shipping. The lake data indicate that the lake was limited by nitrogen in the fall (i.e., the mean inorganic nitrogen/orthophosphorus ratio was 12/1). At the other sampling times, the data indicate phosphorus limitation (i.e., the mean N/P ratios were greater than 30/1 in March and July).

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the South Carolina National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of March and January when two samples were collected. Sampling was begun in February, 1973, and was completed in February, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the South Carolina District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were calculated using mean concentrations and mean flows. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient loads, in $kg/km^2/year$, at stations B-1, D-1, E-1, F-1, and G-1 and multiplying the means by the ZZ area in km^2.

The operator of the Pageland south wastewater treatment plant provided monthly effluent samples and corresponding flow data.

A. Waste Sources:

1. Known municipal* -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Pageland, S. plant	800	stab. pond	707.8	Big Black Creek

2. Known industrial** - None

* Anonymous, 1971.
** Foley, 1976.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Black Creek	1,345	40.7
Unnamed Creek B-1	45	1.4
Lower Alligator Creek	45	1.4
Little Beaverdam Creek	100	3.0
Unnamed Creek E-1	20	0.6
Big Beaverdam Creek	150	4.5
Pond Hollow Branch	100	3.0
b. Minor tributaries & immediate drainage (non-point load) -	400	12.1
c. Known municipal STP's -		
Pageland	925	28.0
d. Septic tanks* -	25	0.8
e. Known industrial - None	-	-
f. Direct precipitation** -	150	4.5
Total	3,305	100.0

2. Outputs -

Lake outlet - Black Creek 3,295

3. Net annual P accumulation - 10 kg.

* Estimate based on 80 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Black Creek	67,505	61.8
Unnamed Creek B-1	1,310	1.2
Lower Alligator Creek	3,050	2.8
Little Beaverdam Creek	3,490	3.2
Unnamed Creek E-1	425	0.4
Big Beaverdam Creek	5,640	5.2
Pond Hollow Branch	2,390	2.2
b. Minor tributaries & immediate drainage (non-point load) -	11,575	10.6
c. Known municipal STP's -		
Pageland	3,490	3.2
d. Septic tanks* -	855	0.8
e. Known industrial - None	-	-
f. Direct precipitation** -	9,370	8.6
Total	109,100	100.0

2. Outputs -

Lake outlet - Black Creek 93,330

3. Net annual N accumulation - 15,770 kg.

* Estimate based on 80 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Black Creek	5	241
Unnamed Creek B-1	5	152
Lower Alligator Creek	3	174
Little Beaverdam Creek	5	160
Unnamed Creek E-1	6	133
Big Beaverdam Creek	6	219
Pond Hollow Branch	7	176

E. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m²/yr	0.38	0.01	12.6	1.8

Vollenweider phosphorus loadings (g/m²/yr) based on mean depth and mean hydraulic retention time of Lake Robinson:

"Dangerous" (eutrophic loading)	0.92
"Permissible" (oligotrophic loading)	0.46

V. LITERATURE REVIEWED

Foley, John R., 1976. Personal communication (permitted point sources in Lake Robinson drainage; cooling water use). SC Dept. of Health & Env. Contr., Columbia.

Martin, R. O. R., and Ronald L. Hanson, 1966. Reservoirs in the United States. Water Supply Paper 1838, U.S. Geol. Surv., Wash., DC.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN MANIPNDS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN	MEAN CHLORA	15-MIN	MEDIAN DISCHARGE
4503	FISHING CREEK RESERVOIR	0.140	0.535	483.000	2.411	10.200	0.051
4504	LAKE GREENWOOD	0.061	0.470	463.917	8.150	15.000	0.011
4505	LAKE HARTWELL	0.014	0.130	422.000	5.157	15.000	0.004
4506	LAKE MARION	0.055	0.280	470.170	8.728	14.900	0.016
4507	LAKE MURRAY	0.024	0.260	424.905	6.418	15.000	0.007
4508	LAKE MORINSON	0.014	0.260	458.778	8.611	14.000	0.005
4510	LAKE WATEREE	0.094	0.450	475.657	8.408	14.100	0.030
4511	LAKE WYLIE	0.045	0.340	462.222	5.422	14.400	0.013
4512	LAKE MOULTRIE	0.024	0.200	455.38	8.800	11.200	0.005
4513	LAKE MOWEE	0.004	0.170	471.750	2.433	15.000	0.003
4514	LAKE SECESSION	0.057	0.355	462.778	10.722	15.000	0.005
4515	SALUDA LAKE	0.041	0.230	476.833	1.517	10.400	0.004
4516	LAKE WILLIAM C. HOWE	0.022	0.360	454.884	3.911	15.000	0.007

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLOPA	15-MIN ( )	MEDIAN SESS DEPTH P	INDEX NO
4503	FISHING CREEK RESERVOIR	0 (0)	0 (0)	0 (0)	92 (11)	100 (12)	0 (0)	192
4504	LAKE GREENWOOD	17 (2)	8 (1)	33 (4)	42 (5)	21 (0)	25 (3)	146
4505	LAKE HARTWELL	92 (11)	100 (12)	92 (11)	58 (7)	21 (0)	92 (11)	455
4506	LAKE MARION	33 (4)	50 (6)	25 (3)	17 (2)	50 (6)	33 (4)	208
4507	LAKE MURRAY	67 (8)	62 (7)	83 (10)	50 (6)	21 (0)	46 (5)	329
4508	LAKE ROBINSON	83 (10)	62 (7)	67 (8)	25 (3)	75 (9)	83 (10)	395
4510	LAKE WATEREE	8 (1)	17 (2)	17 (2)	33 (4)	67 (8)	8 (1)	150
4511	LAKE WYLIE	50 (6)	25 (3)	50 (6)	67 (8)	58 (7)	17 (2)	267
4512	LAKE MOULTRIE	58 (7)	83 (10)	75 (9)	8 (1)	83 (10)	71 (8)	378
4513	LAKE KEOWEE	100 (12)	92 (11)	100 (12)	83 (10)	21 (0)	100 (12)	496
4514	LAKE SECESSION	25 (3)	42 (5)	42 (5)	0 (0)	21 (0)	58 (7)	188
4515	SALUDA LAKE	42 (5)	75 (9)	8 (1)	100 (12)	92 (11)	71 (8)	388
4516	LAKE WILLIAM C. BOWEN	75 (9)	33 (4)	58 (7)	75 (9)	21 (0)	46 (5)	308

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	4513	LAKE KEOWEE	496
2	4505	LAKE HARTWELL	455
3	4508	LAKE ROBINSON	395
4	4515	SALUDA LAKE	388
5	4512	LAKE MOULTRIE	378
6	4507	LAKE MURRAY	329
7	4516	LAKE WILLIAM C. BOWEN	308
8	4511	LAKE WYLIE	267
9	4506	LAKE MARION	208
10	4503	FISHING CREEK RESERVOIR	192
11	4514	LAKE SECESSION	188
12	4510	LAKE WATEREE	150
13	4504	LAKE GREENWOOD	146

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR SOUTH CAROLINA 04/27/76

LAKE CODE 4504 LAKE NUMBER

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 448.1

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
4504A1	448.1	5.07	5.92	6.77	7.50	5.52	5.24	5.10	6.80	5.10	5.24	5.52	6.09	6.56
4504A2	274.7	5.46	6.65	7.13	5.83	3.99	3.68	3.62	4.73	3.68	3.91	4.19	4.47	4.80
4504B1	5.6	0.113	0.113	0.142	0.113	0.085	0.057	0.057	0.085	0.057	0.085	0.085	0.085	0.090
4504C1	17.5	0.23	0.25	0.28	0.23	0.14	0.14	0.14	0.17	0.14	0.14	0.17	0.17	0.18
4504D1	21.4	0.23	0.31	0.34	0.25	0.20	0.17	0.17	0.23	0.17	0.17	0.20	0.20	0.23
4504E1	1.6	0.028	0.057	0.057	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.033
4504F1	25.7	0.31	0.37	0.40	0.31	0.23	0.20	0.20	0.25	0.20	0.23	0.23	0.25	0.26
4504G1	13.6	0.17	0.20	0.23	0.17	0.11	0.11	0.11	0.14	0.11	0.11	0.11	0.14	0.14
4504Z2	88.4	0.99	1.16	1.22	0.99	0.68	0.62	0.62	0.79	0.59	0.65	0.71	0.74	0.80

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 448.1
SUM OF SUB-DRAINAGE AREAS = 434.0

TOTAL FLOW IN = 78.72
TOTAL FLOW OUT = 78.86

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4504A1	2	73	10.614	24	8.445				
	3	73	10.336	9	13.309	15	12.035		
	4	73	12.319	7	15.161				
	5	73	6.654	4	8.070				
	6	73	8.929	9	6.513				
	7	73	6.711	8	7.362				
	8	73	4.984	2	5.522				
	9	73	4.021	4	3.200				
	10	73	3.681	1	4.248				
	11	73	3.681	3	3.285				
	12	73	6.173	7	4.021				
	1	74	7.361	8	9.203	21	6.230		
	2	74	7.345	10	9.486				
4504A2	2	73	8.495	24	6.173				
	3	73	7.221	9	9.911	15	9.486		
	4	73	10.194	7	14.466				
	5	73	4.814	4	5.522				
	6	73	6.513	9	4.870				
	7	73	4.672	8	4.106				
	8	73	3.256	2	3.256				
	9	73	2.549	4	1.869				
	10	73	2.203	1	2.888				
	11	73	2.124	3	1.841				
	12	73	3.964	7	2.492				
	1	74	4.814	8	4.531	21	3.625		
	2	74	6.746	10	7.504				

TRIBUTARY FLOW INFORMATION FOR SOUTH CAMELBACK

DRAINAGE AREA = 1.22 SQUARE MILES

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
NORTH	2	73	0.113	24	0.311				
	3	73	0.170	9	0.283	15	0.255		
	4	73	0.113	7	0.142				
	5	73	0.085	4	0.113				
	6	73	0.142	9	0.198				
	7	73	0.085	8	0.142				
	8	73	0.085	2	0.113				
	9	73	0.085	4	0.057				
	10	73	0.057	1	0.142				
	11	73	0.057	3	0.085				
	12	73	0.113	7	0.113				
	1	74	0.142	8	0.142	21	0.113		
	2	74	0.170	10	0.227				
CENTRAL	2	73	0.198	24	0.651				
	3	73	0.368	9	0.566	15	0.425		
	4	73	0.227	7	0.255				
	5	73	0.170	4	0.227				
	6	73	0.283	9	0.396				
	7	73	0.198	8	0.255				
	8	73	0.198	2	0.198				
	9	73	0.142	4	0.113				
	10	73	0.142	1	0.255				
	11	73	0.142	3	0.113				
	12	73	0.227	7	0.170				
	1	74	0.283	8	0.255	21	0.227		
	2	74	0.340	10	0.481				
SOUTH	2	73	0.255	24	0.821				
	3	73	0.453	9	0.708	15	0.510		
	4	73	0.283	7	0.311				
	5	73	0.198	4	0.283				
	6	73	0.368	9	0.481				
	7	73	0.227	8	0.340				
	8	73	0.227	2	0.255				
	9	73	0.198	4	0.142				
	10	73	0.170	1	0.396				
	11	73	0.170	3	0.142				
	12	73	0.283	7	0.227				
	1	74	0.340	8	0.340	21	0.283		
	2	74	0.340	10	0.595				
WEST	2	73	0.028	24	0.113				
	3	73	0.057	9	0.113	15	0.085		
	4	73	0.057	7	0.057				
	5	73	0.028	4	0.028				
	6	73	0.057	9	0.057				
	7	73	0.028	8	0.057				
	8	73	0.028	2	0.028				
	9	73	0.028	4	0.028				
	10	73	0.028	1	0.085				
	11	73	0.028	3	0.028				
	12	73	0.057	7	0.057				
	1	74	0.057	8	0.057	21	0.057		
	2	74	0.085	10	0.085				

TRIBUTARY FLOW INFORMATION FOR SOUTH CAROLINA 04/27/76

LAKE CODE 4508 LAKE ROBINSON

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4508F1	2	73	0.311	24	0.963				
	3	73	0.538	9	0.850	15	0.623		
	4	73	0.340	7	0.368				
	5	73	0.255	4	0.340				
	6	73	0.425	9	0.566				
	7	73	0.283	8	0.396				
	8	73	0.283	2	0.311				
	9	73	0.227	4	0.142				
	10	73	0.198	1	0.481				
	11	73	0.198	3	0.170				
	12	73	0.340	7	0.283				
	1	74	0.425	8	0.396	21	0.340		
	2	74	0.510	10	0.708				
4508G1	2	73	0.170	24	0.510				
	3	73	0.283	9	0.453	15	0.340		
	4	73	0.170	7	0.198				
	5	73	0.142	4	0.170				
	6	73	0.227	9	0.311				
	7	73	0.142	8	0.198				
	8	73	0.142	2	0.170				
	9	73	0.113	4	0.085				
	10	73	0.113	1	0.227				
	11	73	0.113	3	0.085				
	12	73	0.170	7	0.142				
	1	74	0.227	8	0.198	21	0.170		
	2	74	0.255	10	0.368				
4508Z7	2	73	0.793	24	2.549				
	3	73	1.416	9	2.265	15	1.699		
	4	73	0.906	7	0.991				
	5	73	0.680	4	0.906				
	6	73	1.161	9	1.501				
	7	73	0.736	8	1.048				
	8	73	0.736	2	0.793				
	9	73	0.623	4	0.425				
	10	73	0.510	1	0.566				
	11	73	0.510	3	0.425				
	12	73	0.850	7	0.623				
	1	74	1.133	8	1.048	21	0.906		
	2	74	1.274	10	1.841				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/04/27

450M01
34 24 25.0 080 09 05.0 3
CAPE ROBINSON
45031 SOUTH CAROLINA
030791

FEMALES 2111202
0031 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/22	10	00 0000	17.6		48	50K	6.00	10K	0.080	0.500	0.630	0.005
	10	00 0006	17.5	8.6		50K	6.10	10K	0.070	0.400	0.620	0.004
	10	00 0012	17.5	8.4		50K	6.20	10K	0.070	0.300	0.580	0.004
	10	00 0019	17.5	8.5		50K	6.10	10K	0.060	0.300	0.630	0.005
	10	00 0027	17.5	8.4		50K	6.10	10K	0.070	0.300	0.610	0.006
73/07/06	11	00 0000	32.4		36	50K	5.60	10K	0.150	0.300	0.120	0.011
	11	00 0006	32.1	6.6		50K	5.60	10K	0.100	0.300	0.100	0.012
	11	00 0015	31.5	6.6		50K	5.40	10K	0.230	0.400	0.110	0.012
	11	00 0031	27.2	1.0		50K	5.40	10K	0.310	0.600	0.140	0.020
73/09/21	12	40 0000	30.0	7.8	40	14	6.30	10K	0.130	1.400	0.080	0.015
	12	40 0015	28.9	6.6		14	6.10	10K	0.060	0.500	0.060	0.014
	12	40 0030	28.6	5.6		13	6.10	10K	0.060	0.500	0.060	0.011

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/22	10	00 0000	0.014	9.4
	10	00 0006	0.011	
	10	00 0012	0.009	
	10	00 0019	0.014	
	10	00 0027	0.020	
73/07/06	11	00 0000	0.016	3.0
	11	00 0006	0.013	
	11	00 0015	0.017	
	11	00 0031	0.025	
73/09/21	12	40 0000	0.020	17.3
	12	40 0015	0.014	
	12	40 0030	0.013	

[illegible]
[illegible] INDICATED

STORET RETRIEVAL DATE 73/04/27

450402
34 26 25.0 080 09 12.0 3
LAKE ROBINSON
45025 SOUTH CAROLINA
0307#1

11EPALES 2111202
0027 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/22	12 20	0000	17.2		4K	50K	6.00	10K	0.080	0.500	0.710	0.004
	12 20	0006	17.2	8.5		50K	5.90	10K	0.090	0.400	0.720	0.004
	12 20	0012	17.2	8.6		50K	6.10	10K	0.070	0.400	0.670	0.004
	12 20	0018	17.0	8.4		50K	6.20	10K	0.080	0.300	0.710	0.005
73/07/06	10 30	0000	34.0		3K	50K	5.30	10K	0.120	0.400	0.100	0.005
	10 30	0006	32.5	5.5		50K	5.40	10K	0.110	0.300	0.110	0.005
	10 30	0015	29.7	4.7		50K	5.40	10K	0.140	0.400	0.110	0.007
	10 30	0023	27.6	2.7		50K	5.30	10K	0.140	0.600	0.130	0.005
73/04/21	13 00	0000	32.0	7.0	37	14	6.20	10K	0.080	0.900	0.060	0.016
	13 00	0010	28.9	6.0		13	5.70	10K	0.070	0.400	0.060	0.010
	13 00	0019	26.4	3.0		14	5.60	10K	0.100	0.600	0.060	0.010

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/22	12 20	0000	0.013	9.0
	12 20	0006	0.012	
	12 20	0012	0.011	
	12 20	0018	0.013	
73/07/06	10 30	0000	0.015	7.5
	10 30	0006	0.013	
	10 30	0015	0.015	
	10 30	0023	0.019	
73/04/21	13 00	0000	0.016	20.5
	13 00	0010	0.010	
	13 00	0019	0.012	

A VALUE FOLLOWED BY A
LESS THAN INDICATES

STORET RETRIEVAL DATE 76/04/27

450803
34 28 07.0 080 10 13.0 3
LAKE ROBINSON
45025 SOUTH CAROLINA
030791

11EPALES 2111202
0009 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/22	12	55 0000	12.9		48	50K	6.60	10K	0.100	0.400	0.750	0.004
	12	55 0005	12.9	8.6		50K	6.10	10K	0.080	0.400	0.720	0.002
73/07/06	09	50 0000	33.0		36	50K	5.40	10K	0.120	1.000	0.110	0.006
	09	50 0006	30.6	6.0		50K	5.50	10K	0.080	0.300	0.080	0.005
	09	50 0010	26.4	5.2		50K	5.50	10K	0.120	0.300	0.120	0.005
73/04/21	13	35 0000	31.1	7.8	42	12	6.30	10K	0.090	0.900	0.080	0.011
	13	35 0007	23.2	5.6		9	5.70	10K	0.060	0.400	0.070	0.011

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/22	12	55 0000	0.012	1.4
	12	55 0005	0.012	
73/07/06	09	50 0000	0.023	1.5
	09	50 0006	0.014	
	09	50 0010	0.018	
73/04/21	13	35 0000	0.014	11.9
	13	35 0007	0.012	

K VALUE KNOWN TO BE
LESS THAN INDICATED

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 76/04/27

450BA1
34 24 00.0 080 09 00.0 4
BLACK CREEK
45 7.5 LK ROBINSON
O/ROBINSON LAKE 030791
RD BRDG AT GAGING STATION BELO DAM
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/24	10 07		0.034	0.290	0.013	0.006	0.015
73/03/09	16 35		0.020	0.280	0.011	0.012	0.015
73/03/15	17 38		0.018	0.320	0.021	0.010	0.010
73/04/07	10 30		0.027	0.290	0.034	0.005K	0.010
73/05/04	17 45		0.052	0.520	0.046	0.006	0.015
73/06/09	10 00		0.052	0.840	0.029	0.008	0.020
73/07/08	10 10		0.014	0.330	0.040	0.010	0.015
73/08/02	17 45		0.010K	0.390	0.029	0.006	
73/09/04	17 45		0.011	0.580	0.032	0.005K	0.015
73/10/01	10 15		0.012	0.480	0.067	0.005K	0.025
73/11/03	14 00		0.024	0.350	0.020	0.012	
73/12/07	13 30		0.036	0.800	0.052	0.008	0.020
74/01/08	13 30		0.048	0.400	0.020	0.008	0.015
74/01/21	17 45		0.032	0.100K	0.012	0.008	0.025
74/02/10	13 15		0.028	0.400	0.020	0.005	0.006

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

450MA2
44 35 30.0 080 11 00.0 4
BLACK CREEK
45 7.5 MIDDENDORF
I/ROBINSON LAKE 030791
US RT 1 BRDG 2 MI N OF LAKE
11ENGLES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/24	11 00		0.046	0.140	0.018	0.005K	0.005K
73/03/09	17 05		0.010K	0.290	0.017	0.008	0.010
73/03/15	18 40		0.016	0.170	0.017	0.005K	0.010
73/04/07	11 25		0.010K	0.460	0.020	0.005K	0.010
73/05/04	18 35		0.025	1.200	0.190	0.022	0.040
73/06/09	10 35		0.044	0.440	0.029	0.006	0.020
73/07/08	11 05		0.056	0.460	0.060	0.010	0.020
73/08/02	18 45		0.042	0.370	0.032	0.005K	
73/09/04	18 45		0.050	0.600	0.072	0.005K	0.015
73/10/01	10 54		0.028	1.150	0.035	0.005K	0.015
73/11/03	14 55		0.036	0.150	0.008	0.008	0.010
73/12/07	14 45		0.048	0.500	0.120	0.008	0.015
74/01/08	14 35		0.028	0.200	0.012	0.005K	0.010
74/01/21	18 35		0.064	0.100K	0.020	0.008	0.015
74/02/10	14 15		0.008	0.300	0.010	0.010	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

4508B1
34 28 00.0 080 10 30.0 4
UNNAMED CREEK
45 7.5 LK ROBINSON
T/ROBINSON LAKE 030791
RD BRDG ON W SIDE OF LAKE
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/24	11	20	0.030	0.120	0.008	0.005K	0.005K
73/03/09	17	20	0.031	0.690	0.034	0.007	0.010
73/03/15	17	50	0.081	0.960	0.100	0.005K	0.020
73/04/07	11	45	0.011	0.200	0.013	0.005K	0.015
73/05/04	17	55	0.034	0.830	0.042	0.007	0.015
73/06/09	13	15	0.016	0.290	0.025	0.006	0.025
73/07/08	11	25	0.014	0.500	0.176	0.007	0.020
73/08/02	19	05	0.010K	0.230	0.047	0.006	
73/09/04	19	10	0.010K	0.460	0.028	0.006	0.015
73/10/01	11	06	0.021	0.690	0.066	0.005K	0.015
73/11/03	15	20	0.016	0.100K	0.016	0.005K	0.005
73/12/07	15	20	0.016	0.400	0.100	0.005K	0.020
74/01/08	14	55	0.052	0.600	0.136	0.005K	0.015
74/01/21	18	55	0.064	0.100	0.016	0.005K	0.015
74/02/10	14	45	0.032	0.300	0.015	0.005	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/04/27

450MC1
34 29 00.0 080 10 30.0 4
DUARTE ALLIGATOR CREEK
45 7.5 LA HODGSON
17-0M1450% LAKE 010791
MO BRDG NEAR N END OF LAKE ON W SIDE
11EPALES 211120M
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 N02&N03 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/26	11 15		0.160	0.100K	0.010	0.005K	0.005K
73/03/09	17 15		0.130	0.260	0.018	0.005K	0.005K
73/03/15	18 00		0.390	0.230	0.012	0.005K	0.01K
73/04/07	11 40		0.120	0.180	0.006	0.005K	0.005K
73/05/04	18 50		0.105	0.400	0.013	0.005K	0.005K
73/05/09	13 00		0.110	1.150	0.046	0.005K	0.010
73/07/04	11 20		0.115	0.380	0.030	0.005K	0.005K
73/08/02	18 55		0.087	0.130	0.042	0.005K	
73/09/04	18 55		0.100	0.320	0.021	0.005K	0.005K
73/10/01	11 00		0.074	0.920	0.050	0.005K	0.010
73/11/03	15 10		0.132	0.550	0.044	0.005K	0.005K
73/12/07	15 00		0.116	0.600	0.168	0.005K	0.015
74/01/08	14 45		0.112	0.200	0.012	0.005K	0.005K
74/01/21	17 55		0.240	0.100K	0.040	0.005K	0.010
74/02/10	14 25		0.184	0.300	0.030	0.005	0.005K

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

450801
34 29 30.0 080 10 00.0 4
LITTLE BEAVERDAM BRANCH
45 7.5 LK RUBINSON
T/RUBINSON LAKE 030791
RD BRDG NEAR N END OF LAKE ON E SIDE
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/24	10 50		0.105	0.260	0.014	0.005K	0.005K
73/03/04	17 00		0.061	0.510	0.021	0.005K	0.010
73/03/15	18 35		0.020	0.530	0.039	0.004	0.030
73/04/07	11 20		0.052	0.250	0.013	0.005K	0.010
73/05/04	18 22		0.054	0.780	0.034	0.007	0.015
73/05/04	10 30		0.056	0.380	0.024	0.005K	0.020
73/07/04	10 [illegible]		0.044	0.[illegible]2	0.140	0.005K	0.01[illegible]
73/08/02	14 15		0.042	0.370	0.036	0.005K	
73/09/04	14 30		0.038	0.550	0.031	0.016	0.016
73/10/01	10 45		0.035	0.630	0.040	0.005K	0.025
73/11/01	14 45		0.044	0.150	0.008	0.005K	0.010
73/12/07	14 15		0.048	0.500	0.068	0.005K	0.025
74/01/08	14 20		0.046	0.200	0.016	0.005K	0.010
74/01/21	18 25		0.104	0.200	0.022	0.006	0.006
74/02/10	14 00		0.108	0.400	0.045	0.005	0.005K

* VALUE SHOWN IS MDL
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/04/27

[illegible]
39 29 00.0 080 09 10.0 4
UNNAMED CREEK
45 [illegible] HUNTSON
17 ROBINSON LAKE 03071
HD HNDG .7 MI SW OF GREEN HILL
FEMALES 21112044
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/26	10	45	0.031	0.100K	0.029	0.005K	0.005K
73/03/04	16	55	0.023	0.580	0.042	0.006	0.015
73/03/15	10	10	0.046	0.315	0.008	0.005K	0.010
73/04/01	11	10	0.022	0.420	0.021	0.005K	0.020
73/05/04	18	10	0.016	0.400	0.035	0.011	0.043
73/06/09	10	20	0.012	0.370	0.066	0.009	0.030
73/07/08	10	45	0.021	0.750	0.140	0.011	0.035
73/08/02	18	25	0.010K	0.350	0.110	0.016	
73/09/04	18	20	0.010K	0.185	0.120	0.005K	0.035
73/10/01	10	37	0.010K	0.820	0.071	0.007	0.030
73/11/03	14	35	0.012	0.150	0.020	0.008	0.008
73/12/07	14	15	0.014	0.500	0.036	0.005K	0.015
74/01/08	14	15	0.032	0.400	0.036	0.008	0.010
74/01/21	18	15	0.028	0.100K	0.028	0.008	0.010
74/02/10	13	45	0.020	0.400	0.035	0.005	0.005K

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

450BF1
34 28 00.0 080 08 30.0 4
BIG BEAVERDAM CREEK
45 7.5 LK ROBINSON
T/ROBINSON LAKE 030791
RD BRDG .6 MI SE OF GREEN HILL
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/24	10 40		0.500	0.150	0.012	0.005K	0.010
73/03/09	16 50		0.410	0.230	0.009	0.005K	0.012
73/03/15	18 15		0.010K	0.160	0.007	0.005K	0.010
73/04/07	11 05		0.399	0.240	0.017	0.005K	0.012
73/05/04	19 20		0.027	0.370	0.040	0.006	0.015
73/06/09	10 15		0.330	0.820	0.023	0.005	0.025
73/07/03	10 35		0.336	0.250	0.020	0.009	0.020
73/08/02	18 15		0.294	0.230	0.019	0.005K	
73/09/04	18 10		0.315	0.100K	0.030	0.006	0.015
73/10/01	10 30		0.250	1.000	0.120	0.005K	0.030
73/11/03	14 25		0.336	0.250	0.072	0.005K	0.010
73/12/07	13 55		0.400	0.500	0.076	0.005K	0.030
74/01/08	14 05		0.394	0.500	0.078	0.016	0.030
74/01/21	18 05		0.450	0.100K	0.016	0.008	0.020
74/02/10	13 35		0.528	0.200	0.010	0.005	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

450MD1
34 25 00.0 080 08 30.0 4
POND HOLLOW BRANCH
45 7.5 LK ROBINSON
T/ROBINSON LAKE 030791
RD BRDG 1 MI N OF NEW MARKET
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/02/24	10 30		0.011	0.100K	0.015	0.005K	0.005K
73/03/09	16 40		0.015	0.190	0.016	0.005K	0.010
73/03/15	18 35		0.120	0.560	0.007	0.005K	0.005K
73/04/07	10 55		0.154	1.150	0.132	0.006	0.040
73/05/04	19 00		0.072	1.000	0.180	0.011	0.020
73/06/09	10 00		0.074	0.420	0.092	0.006	0.035
73/07/08	10 20		0.026	0.520	0.350	0.005K	0.020
73/08/02	18 00		0.126	0.290	0.080	0.006	0.040
73/09/04	17 55		0.050	0.230	0.147	0.006	0.025
73/10/01	10 20		0.048	0.610	0.110	0.005K	0.025
73/11/03	14 15		0.034	0.150	0.062	0.005K	0.015
73/12/07	13 45		0.088	0.300	0.040	0.005K	0.050
74/01/08	13 50		0.288	0.700	0.056	0.005K	0.010
74/01/21	18 45		0.156	0.100K	0.016	0.005K	0.005K
74/02/10	13 25		0.232	0.300	0.063	0.005K	0.035

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/04/27

4508AA IP4508AA P001200
3S 45 28.0 080 23 40.0 4
PAGELAND
45 CHESTERFIELD CO
T/LAKE ROBINSON 030791
BIG BLACK CREEK
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/06/04			0.100	15.000	3.750	3.320	4.300		
73/07/09	16 00		0.060	26.000	1.980	2.840	5.300		
73/08/08	15 00		0.270	11.500	0.170	2.100	3.400	0.150	0.150
73/09/10	15 00		0.044	13.800	0.600	3.120	4.600	0.200	0.175
73/10/28	15 00		0.130	18.000	0.105	3.150	5.250	0.200	0.175
74/01/30	11 00		6.800	1.300	0.080	3.200	3.400	0.200	0.175
74/03/08	15 00		0.080	12.000	4.500	2.100	2.900	0.200	0.185
74/04/29	15 00		0.120	14.000	5.000	2.700	3.750	0.250	0.250
74/06/07	11 00		0.040	13.750	3.900	2.100	2.700	0.200	0.175
74/07/01	14 30		0.040	16.000	4.800	2.400	3.500	0.180	0.200
74/09/03	11 00		0.040	13.000	0.610	0.170	2.500	0.179	0.200